

CLAIMS

I Claim:

- 1 1. A method of performing retransmission and flow control comprising:
 - 2 a. configuring a back channel between a transmitting device and a receiving device
 - 3 for providing retransmission and flow control information from the receiving
 - 4 device to the transmitting device related to a stream of isochronous data packets
 - 5 transmitted from the transmitting device to the source device;
 - 6 b. monitoring the stream of isochronous data packets received at the receiving device
 - 7 for necessary retransmission or flow control;
 - 8 c. configuring a back channel packet for indicating a retransmission or flow control
 - 9 function to perform; and
 - 10 d. transmitting the back channel packet from the receiving device to the transmitting
 - 11 device over the back channel.
- 1 2. The method according to Claim 1 wherein configuring the back channel includes
 - 2 configuring a transmitting plug on the receiving device for transmitting the back channel
 - 3 packet over the back channel and configuring a receiving plug on the transmitting device
 - 4 for receiving the back channel packet over the back channel.
- 1 3. The method according to Claim 1 wherein the stream of isochronous data packets is
 - 2 transmitted in non real-time.
- 1 4. The method according to Claim 1 wherein the back channel packet includes a control
 - 2 instruction that instructs the transmitting device to reset transmission of the stream of

isochronous data packets starting from a specified packet within the stream of isochronous data packets.

5. The method according to Claim 4 wherein the back channel packet includes a dbc field that identifies the specific packet within the stream of isochronous data packets.

6. The method according to Claim 4 wherein the back channel packet includes a control field that contains a value corresponding to the control instruction.

7. The method according to Claim 1 wherein the back channel packet includes a control instruction that instructs the transmitting device to stop transmitting the stream of isochronous data packets.

8. The method according to Claim 1 wherein the stream of isochronous data packets includes audio/visual content data.

9. The method according to Claim 1 wherein the back channel packet is an isochronous data packet.

10. The method according to Claim 1 wherein the back channel packet is an asynchronous data packet.

11. The method according to Claim 1 wherein the back channel is an isochronous channel.

12. A method of performing retransmission and flow control comprising:
a. configuring an isochronous channel between a transmitting device and a receiving device as an isochronous back channel for providing retransmission and flow

control information from the receiving device to the transmitting device related to a stream of isochronous data packets transmitted from the transmitting device to the source device;

- b. monitoring the stream of isochronous data packets received at the receiving device for necessary retransmission or flow control;
- c. configuring an isochronous back channel packet for indicating a retransmission or flow control function to perform; and
- d. transmitting the isochronous back channel packet from the receiving device to the transmitting device over the isochronous back channel.

13. The method according to Claim 12 wherein configuring the isochronous channel includes configuring a transmitting plug on the receiving device for transmitting the isochronous back channel packet over the isochronous back channel and configuring a receiving plug on the transmitting device for receiving the isochronous back channel packet over the isochronous back channel.

14. The method according to Claim 12 wherein the stream of isochronous data packets is transmitted in non real-time.

15. The method according to Claim 12 wherein the isochronous back channel packet includes a control instruction that instructs the transmitting device to reset transmission of the stream of isochronous data packets starting from a specified packet within the stream of isochronous data packets.

16. The method according to Claim 15 wherein the isochronous back channel packet includes a dbc field that identifies the specific packet within the stream of isochronous data packets.

- 1 17. The method according to Claim 15 wherein the isochronous back channel packet includes
2 a control field that contains a value corresponding to the control instruction.
- 1 18. The method according to Claim 12 wherein the isochronous back channel packet includes
2 a control instruction that instructs the transmitting device to stop transmitting the stream
3 of isochronous data packets.
- 1 19. The method according to Claim 12 wherein the stream of isochronous data packets
2 includes audio/visual content data.
- 1 20. A method of transmitting flow control and retransmission information comprising:
2 a. configuring a transmitting plug on a receiving device for transmitting an
3 isochronous back channel packet over an isochronous channel via the transmitting
4 plug to a transmitting device;
5 b. determining flow control and retransmission information based on the status of a
6 received isochronous data packet at the receiving device, wherein the received
7 isochronous data packet is one of a stream of isochronous data packets transmitted
8 from the transmitting device to the receiving device;
9 c. packetizing flow control and retransmission information within the isochronous
10 back channel packet; and
11 d. transmitting the isochronous back channel packet from the receiving device over
12 the isochronous back channel via the transmitting plug.
- 1 21. The method according to Claim 20 wherein the stream of isochronous data packets is
2 transmitted in non real-time.

1 22. The method according to Claim 20 wherein the status of the received isochronous data
2 packet indicates a packet transmission error and instructs the transmitting device to reset
3 transmission of the stream of isochronous data packets starting from a specified packet
4 within the stream of isochronous data packets.

1 23. The method according to Claim 20 wherein the status of the received isochronous data
2 packet indicates that the receiving device is not capable of receiving the stream of
3 isochronous data packets and instructs the transmitting device to stop transmitting the
4 stream of isochronous data packets.

1 24. The method according to Claim 20 wherein the status of the received isochronous data
2 packet indicates that the receiving device is capable of resuming reception of the stream
3 of isochronous data packets and instructs the transmitting device to restart transmission of
4 the stream of isochronous data packets starting from a specified packet within the stream
5 of isochronous data packets.

1 25. A method of receiving flow control and retransmission information comprising:
2 a. configuring a receiving plug on a transmitting device for receiving an isochronous
3 back channel packet from a receiving device, wherein the isochronous back
4 channel packet is received over an isochronous channel via the receiving plug;
5 b. receiving the isochronous back channel packet via the receiving plug;
6 c. reading flow control and retransmission information included within the
7 isochronous back channel packet wherein the flow control and retransmission
8 information relates to a stream of isochronous data packets transmitted from the
9 transmitting device to the receiving device and provides a control instruction to
10 the transmitting device to regulate transmission of the stream of isochronous data
11 packets; and

- d. regulating transmission of the stream of isochronous data packets as determined by the control instruction.

26. The method according to Claim 25 wherein the isochronous back channel packet includes identification of the stream of isochronous data packets, a control field that contains a value corresponding to the control instruction, and identification of a specific packet within the stream of isochronous data packets to which the control instruction is to be applied.

27. The method according to Claim 25 wherein the control instruction instructs the transmitting device to reset transmission of the stream of isochronous data packets starting from a specified packet within the stream of isochronous data packets.

28. The method according to Claim 25 wherein the control instruction instructs the transmitting device to stop transmitting the stream of isochronous data packets.

29. The method according to Claim 25 wherein the stream of isochronous data packets is transmitted in non real-time.

30. A method of configuring a plug to support an isochronous back channel comprising:
a. embedding a back channel flow control information block within a plug configuration information block;
b. defining a back channel information type within the back channel flow control information block, wherein the back channel information type indicates an isochronous back channel control mechanism for providing a flow control and retransmission control instruction; and

- 8 c. setting an isochronous channel number field within the back channel flow control
9 information block to indicate the isochronous channel used to send an isochronous
10 back channel packet, wherein the isochronous back channel packet includes the
11 control instruction which is used to regulate a transmission of a stream of
12 isochronous data packets.

1 31. The method according to Claim 30 wherein the back channel flow control information
2 block is embedded within a non real-time plug transfer information block which is
3 embedded within the plug configuration information block.

- 1 32. An apparatus for communicating flow control and retransmission information
2 comprising:
3 a. a configuring circuit to configure a plug to communicate an isochronous back
4 channel packet over an isochronous back channel;
5 b. a packetizing circuit to packetize flow control and retransmission information
6 within the isochronous back channel packet;
7 c. a transceiver circuit configured to communicate the isochronous back channel
8 packet via the plug;
9 d. a de-packetizing circuit to extract the flow control and retransmission information
10 from the isochronous back channel packet; and
11 e. a controller coupled to the configuring circuit, the packetizing circuit, the
12 transceiver circuit, and the de-packetizing circuit to determine a control
13 instruction and a stream of isochronous data packets to which the control
14 instruction is applied from the flow control and retransmission information and
15 apply the control instruction to the determined stream of isochronous data packets.

- 1 33. The apparatus according to Claim 32 wherein the stream of isochronous data packets is
2 transmitted in non real-time.
- 1 34. The apparatus according to Claim 32 wherein the control instruction is an indication to
2 reset transmission of the stream of isochronous data packets starting from a specified
3 packet within the stream of isochronous data packets.
- 1 35. The apparatus according to Claim 34 wherein the isochronous back channel packet
2 includes a dbc field that identifies the specific packet within the stream of isochronous
3 data packets.
- 1 36. The apparatus according to Claim 34 wherein the isochronous back channel packet
2 includes a control field that contains a value corresponding to the control instruction.
- 1 37. The apparatus according to Claim 32 wherein the control instruction is an indication to
2 stop transmitting the stream of isochronous data packets.
- 1 38. The apparatus according to Claim 32 wherein the stream of isochronous data packets
2 includes audio/visual content data.
- 1 39. The apparatus according to Claim 32 wherein the transceiver circuit is configured to
2 transmit isochronous data packets in non real-time via the plug.
- 1 40. The apparatus according to Claim 32 wherein the transceiver circuit is configured to
2 receive isochronous data packets in non real-time via the plug.

- 1 41. An apparatus for communicating flow control and retransmission information
2 comprising:
3 a. means for configuring a plug to communicate an isochronous back channel packet
4 over an isochronous back channel;
5 b. means for packetizing flow control and retransmission information within the
6 isochronous back channel packet;
7 c. means for communicating the isochronous back channel packet via the plug;
8 d. means for extracting the flow control and retransmission information from the
9 isochronous back channel packet; and
10 e. means for controlling coupled to the means for configuring, the means for
11 packetizing, the means for communicating, and the means for de-packetizing,
12 wherein the means for controlling determines a control instruction and a stream of
13 isochronous data packets to which the control instruction is applied from the flow
14 control and retransmission information and applies the control instruction to the
15 determined stream of isochronous data packets.
- 1 42. The apparatus according to Claim 41 wherein the stream of isochronous data packets is
2 transmitted in non real-time.
- 1 43. The apparatus according to Claim 41 wherein the control instruction is an indication to
2 reset transmission of the stream of isochronous data packets starting from a specified
3 packet within the stream of isochronous data packets.
- 1 44. The apparatus according to Claim 43 wherein the isochronous back channel packet
2 includes a dbc field that identifies the specific packet within the stream of isochronous
3 data packets.

- 1 45. The apparatus according to Claim 43 wherein the isochronous back channel packet
2 includes a control field that contains a value corresponding to the control instruction.
- 1 46. The apparatus according to Claim 41 wherein the control instruction is an indication to
2 stop transmitting the stream of isochronous data packets.
- 1 47. The apparatus according to Claim 41 wherein the stream of isochronous data packets
2 includes audio/visual content data.
- 1 48. The apparatus according to Claim 41 wherein the transceiver circuit is configured to
2 transmit isochronous data packets in non real-time via the plug.
- 1 49. The apparatus according to Claim 41 wherein the transceiver circuit is configured to
2 receive isochronous data packets in non real-time via the plug.